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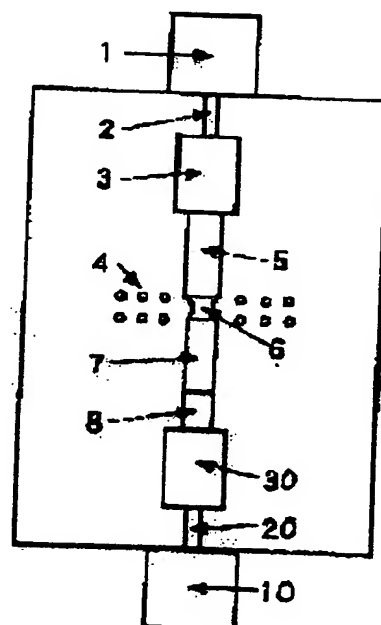
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54) GROWTH OF ZIRCONIUM DIBORIDE SINGLE CRYSTAL

57)Abstract:

PROBLEM TO BE SOLVED: To enable the growth of ZrB_2 single crystal of good quality, free from crystal defect (sub-boundary structure), by growing the crystal in a He gas atmosphere and specifying the melting zone composition and the growing speed, when ZrB_2 single crystal is grown through the floating zone technique.

SOLUTION: A ZrB_2 powder and a B powder are mixed at a specific ratio, the powder is compressed into a bar and the bar is sintered under prescribed conditions to prepare a starting sintered bar 5. The sintered bar 5 is fixed through a holder 3 to the upper shaft 2, and through the holder 30 to a lower shaft 20 thereby fixing the sintered bar 8 for forming the initial melting zone. A sintered boron (B) is inserted between the sintered bar 8 and the starting sintered bar 5 and the sintered boron and its periphery are heated by a work coil with high-frequency current to form the melting zone 6 and the melting zone is allowed to move downward between the upper shaft 2 to the lower shaft 20 thereby growing the single crystal 7. This process is carried out in an atmosphere of He gas, preferably at about 3-15 atmospheric pressure and the molecular ratio B/Zr (atomic ratio) in the melting zone composition is set to about 1.5-2.8 and the growth speed is set to 3-10 cm/hour.



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